NOTE XXVI.

REMARKS ON THE SPECIES OF MATUTA FABR. IN THE COLLECTION OF THE LEYDEN MUSEUM.

BY

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The carcinological collection of our Museum contains no less than 270 specimens of the genus *Matuta* Fabr., preserved in spirits, collected in the seas of the Indo-Pacific Region, from the shores of the Red Sea to those of the eastern islands of the Malayan Archipelago. They belong to six different species, among which the very common *Matuta victrix* Fabr. is represented by no less than nearly 200 specimens, the very rare *Matuta granulosa* Miers on the contrary only by one single individual. Mr. Miers in his excellent Monograph of this genus distinguished nine species and afterwards described a tenth, the *Matuta circulifera* Miers. Of these forms the *Matuta laevidactyla* Miers is not represented in our collection, while the *Matuta lineifera* Miers, *Matuta circulifera* Miers and *Matuta obtusifrons* Miers must be united, the former two with the *Matuta lunaris* Herbst (*rubrolineata* Miers), the third with the *Matuta picta* Hess (Miers), as remarkable varieties of these species.

As characters of first importance in the definition of the species must be considered: the course of the ridge on the outer surface of the hands of the male; the presence and shape of the spines or tubercles with which the latter is armed, and the ridge on the mobile finger being beaded over its whole length or not. I regard as characters of second importance the greater or lesser development of the tubercules on the surface and on the lateral margins of the carapace, and the more or less distinct granulation of the latter and of the outer surface of the hands, while the manner of coloration of the cephalothorax must be considered as a character of a very slight value.

Accepting of the two sections, into which Mr. Miers divides the species of *Matuta*, I admit in the first section (A) two species: *Mat. victrix* Fabr. and *Mat. lunaris* Herbst, the former with the variety *crebrepunctata*, the latter with two varieties, called *lineifera* and *circulifera*; in section (B) I admit the *Mat. granulosa* Miers, *banksii* Miers, *maculata* Miers and *picta* Hess, the latter with the variety *obtusifrons*; the *Mat. laevidactyla* Miers is still unknown to me.

1. *Matuta victrix* Fabr.

Matuta victrix, Miers, A revision of the Species of the Genus *Matuta*, in: Transactions of the Linnean Society of London, II Series, Zoology, Vol. I, Part the fifth, pag. 243, pl. XXXIX, fig. 1—3.

The collection of the Museum contains:

1°. Nearly seventy specimens, collected by Messrs. Pollen and van Dam in the Bay of Pasandava, which *wholly* agree with the above-mentioned description and figures: the spots upon the carapace being numerous, minute, simple and without any tendency to form reticulating lines. The antero-lateral tubercles are scarcely prominent, those of the surface and of the postero-lateral margins being also little developed. Lateral spines straight in the male, slightly directed backwards in the female.

2°. A female specimen from the Red Sea, presented by

Mr. Kossmann, similar to the preceding, but with the spots larger and less numerous, though simple.

3°. Thirteen specimens, collected in the Java seas, presented by Mr. Bleeker, in which the spots of the carapace, as in the Pasandava animals, are very numerous and minute, though sometimes marked with a paler centre, except in one single male specimen where the spots are more numerous, darker red, and form irregular small curved lines and circles, interspersed with simple spots: a remarkable variety as regards the coloration of the carapace.

4°. Seven individuals, collected by Mr. Semmelink on the shores of Bezoeki (Java). In these the spots are very numerous, more crowded, and form small compound spots with paler centre; the tubercles of the carapace, like those of the postero-lateral margins, are more distinctly marked than in the Madagascar specimens but the granulation is the same. They belong to the variety: *crebrepunctata* Miers, but they ought not to be classed as a distinct species.

5°. A fine male from the island of Obi, agreeing with the Bezoeki specimens and belonging to the same variety.

6°. A male specimen from the island of Waigeoei, similar to the Madagascar individuals but having the spots less numerous.

7°. Five examples from the shores of Macassar, Celebes, belonging to the described variety.

8°. Fifteen specimens, collected near the island of Batjan, also similar to the Bezoeki variety.

9°. Three specimens from the island of Sanghir, two of which belong to the above-mentioned variety, but in the third specimen, a large adult male, the spots of the carapace are rather minute and simple, but very crowded and numerous; it forms in some sense a remarkable transition from the typical form to the variety: *crebrepunctata*.

Besides these, our collection contains 70 specimens without locality, for the greater part belonging to the var: *crebrepunctata* mihi.

This species has a wide geographical range, from the Red Sea to the Australian shores throughout the whole Indian Ocean and the Malayan Archipelago; it presents however many local and individual varieties as regards the coloration of the carapace and the more or less distinct tubercles with which it is armed.

2. *Matuta lunaris* Herbst.

Matuta rubrolineata, Miers, l. c. pag. 244, pl. XXXIX, fig. 5 and 6. *Matuta lineifera*, Miers, l. c. pag. 245, pl. XXXIX, fig. 7. *Matuta lunaris* Herbst, Miers, On Malaysian Crustacea, in: Ann. and Mag. of Nat. Hist. for March 1880, pag. 28, footnote. *Matuta circulifera*, Miers, loco eodem, pag. 27, pl. XIV, fig. 5.

The collection contains:

1⁰. A fine male adult specimen without locality, belonging to the typical *lunaris* Herbst (*rubrolineata* Miers), as defined by Hilgendorf, (Monatsb. Ak. Berlin, p. 810, 1878). Distance from the ends of the lateral spines measuring 47 mm., length of the carapace 38 mm. Lateral marginal spines straight and acute; anterolateral and posterolateral tubercles like those of the surface of the cephalothorax very faintly marked, two anterior being quite obsolete. Carapace rather finely granulated. Lobes of the front and extraorbital angles acute.

2⁰. A somewhat smaller male specimen, collected near the island of Banka by Mr. van den Bossche (1861), wholly agreeing with the preceding one.

3⁰. A female specimen, collected in the Java seas by the late Mr. Bleeker. Carapace very finely granulated, nearly smooth, tubercles all obsolete; those of the anterolateral and posterolateral margins as faintly developed as in the described males. Distance from the ends of the lateral marginal spines 35 mm. Also belonging to the typical *lunaris* Herbst.

4°. A nearly adult male and two young female specimens, without locality, belonging to the variety *lineifera* mihi. Carapace rather more finely granulated, antero-lateral tubercles somewhat more distinctly marked, those of the surface less faintly developed, but those of the postero-lateral margins as faintly marked as in the typical form. Lateral marginal spines slightly directed forward in the male, quite straight in the females. For the rest *wholly* agreeing with the true *lunaris* Herbst.

5. Finally five specimens (2 ♂, 3 ♀), presenting the characters of the *Mat. circulifera* Miers: Front distinctly emarginate, with the lobes formed as in the variety *lineifera*. Anterolateral and postero lateral tubercles, like those of the surface nearly as much marked as in the latter variety; lateral marginal spines rather long, straight in the male, a little directed backward in the female. Carapace rather more coarsely granulated than in the preceding variety, marked with strongly defined complete distinct circles, which however can also be distinguished in the male specimen (N°. 4) that belongs to the variety *lineifera*, though they are here very faintly defined by threadlike lines which are *as delicate* as the other lines with which the carapace is marked. For the rest entirely agreeing with the preceding specimens.

It may be allowed to add a very striking character to those given by Mr. Miers, by which the *Mat. lunaris* Herbst may be distinguished at first sight from the closely allied *Mat. victrix* Fabr. In the latter species the external angle of the palm at the end of the inferior margin is armed both in the male and in the female with a conical spine, that is somewhat smaller than the strong conical spine at the base of the oblique ridge on the outer surface of the hand: in the *Mat. lunaris* Herbst however, the first-mentioned smaller spine at the external angle of the palm is totally wanting in both sexes; Mr. Miers does not make mention of this character.

Matuta lunaris Herbst with its two remarkable varieties occurs in the Indian and Pacific Oceans, the Malayan Archipelago as far as the shores of N. W. Australia, and appears to be a rather rare species.

3. *Matuta granulosa* Miers.

Miers, On the Oxystomatous Crustacea, pag. 245, pl. XXXIX, fig. 8 and 9.

A very beautifully colored female specimen, collected on the shores of the island of Amboina, was presented by Mr. Ludeking some years ago. It belongs without any doubt to *Mat. granulosa* Miers, though presenting a remarkable variety as regards the coloration of the carapace, the *simple*, minute, dark red spots being disposed in *symmetrically* reticulating strings which surround spotless places that are smaller and more crowded anteriorly. In our specimen the carapace is also rather *finely* granulated, but the granulation of the cephalothorax is known to be variable in the species of this genus, as we have seen in the *Mat. victrix* Fabr. The antero-lateral obtuse tubercles are nearly equally developed as in *Mat. banksii* Miers, but in some less degree than in *Mat. picta* Hess. Tubercles of the surface of the carapace, like those of the postero-lateral margins very *faintly* marked.

Lateral spines *short*, obtuse, slightly directed forward. Front obtuse, very indistinctly emarginate, with the lobes rounded. Ridge upon the outer surface of the hands with five acute *tubercles* (no spines), the second of which is the largest, the fourth being also a little larger than the three remaining. Lower part of the hand granulous; close to the inferior margin occurs a granular line, which proceeds on the immobile finger, and is formed by some large round depressed tubercles in the middle, that diminish gradually towards the immobile finger and towards the external angle of the inferior margin: quite a similarly shaped granular line is found in the females of *Mat. banksii* and *Mat. picta.* Under surface of this finger somewhat granular like in the two latter species. Ridge upon the immobile finger obsolete.

Mat. granulosa appears to be very rare, our large *Matuta*-collection containing but one single specimen of it. It is found in the Eastern Seas, and may be distinguished from the allied *picta* Hess and *banksii* Miers by the characteristic ridge on the outer surface of the hand being divided in both sexes into five acute *tubercles*, the second of which is the largest. The female of our species differs from the females of these two species by the fourth tubercle of this ridge being no *spine* and by the acute tubercle at the external angle of the inferior margin being *wanted.* The length of the carapace of our specimen measures 25 mm., the distance of the ends of the lateral spines 35 mm.

4. *Matuta banksii* (Leach?) Miers.

Matuta banksii, Miers, on the Oxystomatous Crustacea, pag. 245, pl. XL, fig. 1 and 2.

The Museum contains, besides some typical specimens without locality, rather very fine examples of the following localities:

1°. Eleven specimens from the island of Amboina, entirely agreeing with the above-mentioned figure, having the carapace marked with numerous pink spots, that are crowded together anteriorly and form large compound spots with paler centre at its posterior portion. Last and penultimate joints of the ambulatory legs marked with a large pink blotch.

2°. A female from the shores of the island of Ceram, similar to the preceding specimens.

3°. A fine male from the Timor seas, also quite similar to the Amboina specimens and presented by Dr. Wienecke.

4°. Four beautiful specimens, collected near the island of Sanghir by Mr. Hoedt, wholly agreeing with the preceding but having the carapace otherwise marked, the spots forming small curved lines and circles, that are larger posteriorly but more crowded on the anterior portion of the cephalothorax.

To the characters of this species, given by Mr. Miers, it may be allowed to add the following: The fourth spine on the external surface of the hand is smaller than the second, both in the male and the female, though in a less degree in the latter. In both sexes an acute tubercle is found at the external angle of the hand at the base of the granular line which extends near the inferior margin, proceeding upon the immobile finger; this *tubercle* being represented in *Mat. victrix* Fabr. by a stronger acute *spine*. The larger striated plate on the inner side of the hands prolonged in the direction of the stripes. The hands of both sexes nearly quite similar to each other.

Matuta banksii Miers has been. recorded from the Indian Archipelago (Amboina, Celebes, Bali, Ceram, Timor, Sanghir), New Guinea, the Philippine Islands and the China seas.

Except in its different coloration, this form of *Matuta* is most closely allied to *Mat. picta* Hess (Miers). The males however may be easily distinguished by the acute, triangular, fourth spine on the outer ridge of the hand, it being obtuse and truncate in *Mat. picta*, but when I compare a female Pasandava-specimen of *Mat. picta* with a female Amboina-specimen of *Mat. banksii*, I find the hands wholly similar to each other and only the following differences are to be mentioned: the carapace being somewhat more granulated in the latter species, the antero-lateral tubercles less strongly developed and the lateral spines a little shorter than in *Mat. picta*, so that the females of both species can be distinguished only by the external appearance and the coloration of the cephalothorax.

5. *Matuta maculata* Miers.

Miers, on the Oxystomatous Crustacea, p. 246, pl. XL, fig. 3 and 4.

The Museum contains eight specimens (6 ♂, 2 ♀) of this species, which I found in an unlabelled phial together with specimens of *Mat. victrix* Fabr., var. *crebrepunctata*, *Mat. banksii* Miers and *Mat. lunaris* Herbst, probably originating from the Japanese collection.

With regard to its outward appearance, it greatly resembles young specimens of *Mat. victrix* Fabr., but on closer examination it may be easily distinguished. The carapace is distinctly but finely granulated; antero-lateral margins, with regard to the length of the carapace, comparatively shorter than those of *Mat. victrix* Fabr., antero-lateral tubercles as strongly marked as in that species, tubercles of the surface and of the postero-lateral margins nearly *obsolete*. Front rather little emarginate, with the lobes rounded. Lateral marginal spines *very long*, acute and straight or slightly directed forward. Hand of the male nearly resembling that of *Mat. banksii*, lower part granular with a granular line composed of round granulous depressed tubercles of different size near the inferior margin, the latter armed with some small acute tubercles; at the base of the described granular line near the articulation with the carpus, a small acute tubercle is found in both sexes. Ridge on the outer surface *parallel* with the inferior margin, provided with five prominences, of which the first, third and fifth are indistinct tubercles, the second and the fourth larger, acute, the second being stronger than the fourth. Mobile finger with a ridge that is very finely striated over the greater part of its length, and obscurely beaded towards its distal extremity. Larger striated plate on the inner surface prolonged in the direction of the stripes. Hand of the female having the same form and sculpture as that of the male, in our two specimens the fourth spine on the outer ridge being comparatively stronger than in the male. Ridge of the mobile finger obsolete.

Our species therefore may be easily distinguished from those in which the outer ridge of the hand of the male is parallel with the inferior margin (Section B, Miers), by the little prominent antero-lateral tubercles, by those of the surface and of the postero-lateral margins being nearly obsolete, by the extraordinary *long* lateral marginal spines, by the structure of the external ridge of the hands etc.

The coloration of our specimens has unfortunately much faded, but seems to be marked by numerous, minute spots.

Our largest male specimen has the carapace, measured *between* the marginal spines, 27 mm. broad, and 26 mm. long: length of the marginal lateral spines 9 mm. (In other specimens the spines being rather longer).

The acute triangular groove on the middle of the upper margin of the immobile finger, a character of the *mature* male, occurs already in one of our specimens in which the carapace is only 22 mm. long.

Mat. maculata Miers occurs in the eastern and Chinese seas and appears to be a rather rare species.

6. *Matuta picta* (Hess.) Miers.

Matuta picta Hess, Archiv für Naturg. XXXI, pag. 158, pl. VI, fig. 13. (1865). — *Matuta picta*, Miers, On the Oxystomatous Crustacea, pag. 246, Pl. XL, fig. 5—7. — *Matuta distinguenda* Hoffmann, Recherches sur la Faune de Madagascar, Crust. p. 27, Pl. VI and VII (1874). — *Matuta obtusifrons*, Miers, l. c. pag. 247, pl. XL, fig. 8 and 9. Our collection contains:

1°. Seventeen fine specimens (8 ♂, 9 ♀), collected in the Bay of Pasandava (Madagascar), by Messrs. Pollen and van Dam, types of the *Matuta distinguenda* Hoffmann.

2°. Three beautiful specimens (2 ♂, 1 young female), collected on the shores of the island of Banda-neira (Moluccas), lately presented by Mr. Semmelink.

Our Pasandava-specimens entirely agree with Mr. Miers' description of *Mat. picta*, so that *Mat. distinguenda* Hoffmann is certainly identical with *Mat. picta* Hess. The figures of this species in the »Recherches sur la Faune de Madagascar", are occasionnally a little inaccurate, but some figures, as for instance the one of the right hand of the male (Pl. VII, fig. 56), which seems to represent *two* spines on the outer ridge, and those of the hand of the female (Pl. VI, fig. 49 and 50), where the immobile finger seems to be very short, are nevertheless exact, these hands being figured in an oblique direction. In all our specimens the spots are disposed symmetrically in very thin threadlike reticulating lines. The front in some individuals is very slightly emarginate, in others it is entire. The females are of a smaller size than the males. The relative length of the lateral spines of the carapace is somewhat variable.

As regards the three Banda-Neira specimens, these *wholly* agree with the preceding except in the coloration, the carapace being marked with dark purplish red lines, «that form irregular loops and circles, which are smaller and more crowded anteriorly, and interspersed with spots". The front is entire and rounded, like in some of our Madagascar specimens. Lateral spines rather short. They entirely resemble the figure of *Mat. obtusifrons* Miers (Pl. XL, fig. 8 and 9) and I therefore regard this species as a variety of *Mat. picta* Hess, being only distinguished by its different coloration.

Mat. picta Hess has a wide geographical range, being recorded from Ceylon, Zanzibar, Madagascar, Seychelles, Mauritius, the Moluccas, Fiji Islands, New Hebrides and Australian seas.

Though displaying many varieties in its coloration, our species possesses nevertheless the following striking characters, by which it is easily distinguished from the other species;

Carapace distinctly granulated, especially in the centre and towards the lateral spines, that are of moderate, though somewhat variable length and directed slightly forward. Three *large* tubercles on the antero-lateral margins, like those of the surface and of the postero-lateral margins *strongly* marked. Front rounded, entire or slightly emarginate. Hand in the male not granulous upon its external surface, in the female a little granular upon the lower part, but presenting in both sexes a granular line close to the inferior margin with a small conical spine at its base near the articulation of the carpus and proceeding on the immobile finger, the latter moreover armed with some small acute tubercles at the base of its under margin: this granular line and these acute tubercles are not seen in the male of *Mat. victrix* Fabr., though a faint granular line also occurs in the female of this species, but without the acute tubercles of the base of the immobile finger. Ridge on external surface crossing it *parallel* with the lower margin and terminating at the base of the upper margin of the immobile finger, divided into five lobes; in the male the second being an acute spine, *the remaining small, obtuse or truncate*, in the female the second and also the *fourth* being acute, *spiniform*. Ridge upon the mobile finger of the male distinctly striated in the greater part af its length, and *beaded at its distal extremity*, that of the female being obsolete. The larger striated plate on the inner side of the hands prolonged in the direction of the stripes.

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